

REMARKS

I. In the Specification

Paragraphs [0006] and [0028] have been amended to correct minor typographical errors. Applicant points out that the paragraph numbering employed herein is that of the filed specification and not of Patent Application Publication No. 2006/0118751. No new matter has been added.

II. In the Claims

Claims 1-41 are pending in the application. Claims 12, 35-38 and 41 have been amended herein. Therefore, upon entry of the present amendment, claims 1-41 will be subject to examination.

A. Regarding the Rejection under 35 USC 102(b)

Reference is made to section 2 of the Office Action. Claims 34-36 have been rejected under 35 USC 102(b) as allegedly anticipated by USPN 2,880,961 to Wynn ("Wynn"). Applicant submits that claims 34-36 are patentable under 35 USC 102(b) over *Wynn* at least for the following reasons.

To properly anticipate a claim under 35 USC 102(b), each and every element of the claim must be found, "either expressly or inherently described, in a single prior art reference." *Verdegaal Bros. v. Union Oil Co. of California*, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987). The complete invention must be shown in as complete detail as contained in the claim(s). *Richardson v. Suzuki Motor Co.*, 868 F.2d 1226, 1236, 9 USPQ2d 1913, 1920 (Fed. Cir. 1989). See also MPEP 2131.

Wynn discloses a diaphragm valve having a domed housing 23 and a diaphragm 24 that is centrally disposed within the valve. The diaphragm "includes a flat bottom portion 24h which is essentially elliptical and sides which join the upper and lower elliptical portions along straight – flat surfaces 24g at the ends of the parallel major axes of those ellipses and in region (sic)

between those surfaces and the ellipses by generally ellipsoidal polygons." *Wynn*, col. 3, lines 39-44. (Emphasis added). Additionally, "[t]he center or dependent portion 24b of the diaphragm is provided at the centre (sic) with an upstanding boss 24k which is adapted to be engaged within a frustoconical hole 26a." *Wynn*, col. 4, lines 13-18.

The Examiner has characterized dome 24 of *Wynn* as shaped like an ellipsoid. Applicant notes that this is not correct. As stated in *Wynn*'s specification and as shown in *Wynn*'s Fig. 12, *Wynn*'s diaphragm is shaped like a bathtub rather than an ellipsoid. Therefore, *Wynn* fails to teach "the dome being shaped like a portion of an ellipsoid", as recited in independent claim 34.

For at least these reasons, claim 34 is not anticipated by *Wynn*. Claims 35-36 are also not anticipated by *Wynn* at least for the same reasons as independent claim 34.

Applicant has amended dependent claims 35-38 to point out the invention with greater clarity and without restrictive intent.

B. Regarding The Rejections under 35 USC 103(a)

Reference is made to sections 4-9 of the Office Action.

A *prima facie* case of obviousness requires: (i) a suggestion or motivation to combine; (ii) a reasonable expectation of success; and (iii) a teaching or suggestion of all claim limitations in the prior art. *In re Regal*, 526 F.2d 1399, 1403 n. 6, 188 USPQ2d 136 (CCPA 1975); *Brown v. Williamson Tobacco Corp. v. Philip Morris Inc.*, 229 F.3d 1120, 1125 (Fed. Cir. 2000); *CFMT, Inc. v. Yieldup Intern. Corp.*, 349 F.3d 1333, 1342 (Fed. Cir. 2003). If the proposed modification or combination of the prior art would change the principle of operation of the prior art invention, then the teachings of the references are not sufficient to render the claims *prima facie* obvious. *In re Ratti*, 270 F.2d 810, 123 USPQ 349 (CCPA 1959).

1. The First Rejection under 35 USC 103(a)

Reference is made to section 4 of the Office Action. The Examiner has rejected claims 1, 2, 10, 11, 15, 18, 19, 21, 22, 26, 27 and 31-35 as allegedly obvious over USPN 3,349,795 to Matsutani ("Matsutani") in view of USPN 4,214,604 to Rumsey ("Rumsey"). Because claims 1

and 34 are the only independent claims among the rejected claims, the present remarks will be initially directed to those two independent claims.

Matsutani discloses a diaphragm valve having circular entry ports, in which the inlet and outlet sleeves assume a semicircular shape that arches upwards towards a weir, combining at the valve seat to form a circular shape divided by the weir. *Matsutani*, Figs. 1, 9b, and 10. *Matsutani* also teaches that “[t]he diaphragm 12 is made of polytetrafluoroethylene resins which have little flexibility, and accordingly such a resin is made into a thin membrane and provided with a lining 13 made of elastic materials , such as rubber, to receive compressive force of the compressor 14.” *Matsutani*, col. 2, lines 65-69. Additionally, “[i]n the embodiment of the invention described in the foregoing, a rubber lining 13 was provided on the diaphragm 12, however, it will be apparent to those skilled in the art that the invention can also be applied to a diaphragm valve without lining.” *Matsutani*, col. 5, lines 49-53.

The Examiner has stated that “*Matsutani* discloses a diaphragm valve substantially as claimed but does not disclose an elliptical shape for the valve seat.” Applicant notes that this is not correct.

With regard to claim 1, not only does *Matsutani* not teach a “valve seat having an arched profile of substantially elliptical curvature and a flattened central surface,” that is, a valve seat that includes a weir having a curved profile that is not spiked but substantially flattened, but also *Matsutani* does not teach “a diaphragm (5) made of an elastomeric material” in which “the dome (305) is substantially shaped like a sector of an ellipsoid” because *Matsutani* teaches the use of a semi-spherical diaphragm made with a material having little flexibility. With regard to claim 34, *Matsutani* does not teach a diaphragm with “a dome (305) having a concave side and a convex side, the dome being shaped like a portion of an ellipsoid,” as discussed above.

The deficiencies of *Matsutani* are not cured by the combining the teachings of *Matsutani* with those of *Rumsey*.

Rumsey teaches a straight through flow diaphragm valve having circular inlet and outlet ports that each expand to achieve an intermediate semi-oval shape and that eventually converge to a valve seat having a trapezoidal shape. *Rumsey*, Abstract; Figs. 1, 2, and 4. It is noteworthy

that *Rumsey* expressly states that his invention has a straight-through flow designed to eliminate the use of weirs in diaphragm valves. *Rumsey*, col. 1, lines 1-29.

The Examiner has characterized *Rumsey* as disclosing “another diaphragm valve having an elliptical shape for the diaphragm and a rectangular shape for the sealing flange.” Applicant notes that this is not correct.

Rumsey teaches a wedge-shaped diaphragm, that is, that “the diaphragm 20 comprises a rib-like elastomeric body 45 of generally triangular cross-section providing an apex projecting from the front face of the diaphragm, that is the face which is at the inner side of the diaphragm as mounted in the valve assembly.” *Rumsey*, col. 6, lines 39-44.

More particularly, with regard to claim 1, *Rumsey* does not teach a “valve seat having an arched profile of substantially elliptical curvature and a flattened central surface,” that is, a valve seat that includes a weir having a curved profile that is not spiked but substantially flattened. As mentioned, *Rumsey* teaches instead that the inlet and outlet ports each have a circular cross-section that extends to a semi-oval shape in the area between the port and the seat (*Rumsey*, Fig. 4, cut along line IV-IV, see col. 3, lines 24-25) and that eventually acquires a trapezoidal shape at the seat (*Rumsey*, Fig. 2). Applicant further notes that even the semi-oval cross-section of Fig. 4 has a flat ceiling, opposite to the orientation claimed in independent claim 1, making Applicant’s valve seat design impossible. Still further, Applicant notes that *Rumsey* teaches an elastomeric diaphragm, but that teaching is contrary to that of *Matsutani*. With regard instead to independent claim 34, *Rumsey* does not teach a diaphragm having “the dome being shaped like a portion of an ellipsoid,” because *Rumsey*’s diaphragm is wedge-shaped, as described above.

Therefore, there is not teaching, suggestion or motivation to combine *Matsutani* with *Rumsey*, because *Rumsey* teaches away from *Matsutani* with regard to flow direction and diaphragm structure. Even if such a teaching suggestion, or motivation were present, the combination of *Matsutani* with *Rumsey* still would fail to teach all claim limitations in Applicant’s invention.

For at least these reasons, claims 1 and 34 are patentable the combination of *Matsutani* with *Rumsey*. The claims depending from claims 1 and 34 are also patentable over the *Matsutani*-*Rumsey* combination at least for the same reasons.

2. The Second Rejection under 35 USC 103(a)

Reference is section 5 of the Office Action. Claims 12-13 have been rejected under 35 USC 103(a) as allegedly obvious over *Matsutani* in view of *Rumsey* and in further view of USPN 4,538,638 to *Stack* (“*Stack*”).

Matsutani and *Rumsey* have been discussed above as inapposite. Applicant submits that the deficiencies in these two references with regard to claims 12-13 are not cured by the combination of *Matsutani* and *Rumsey* with *Stack*.

Stack discloses a plastic lined diaphragm valve, in which the liner is stabilized against movement by extending the liner into recesses in the valve body. *Stack*, Title; Abstract. *Stack* differs from Applicant’s invention in several aspects, and still does not disclose a valve seat or a diaphragm shaped like an ellipsoid, as required by claims 12 and 13.

Therefore, claims 12 and 13 are patentable over the combination of *Matsutani*, *Rumsey* and *Stack*. Claim 12 has been amended to replace “consist of” with “comprise”, in conformance with the specification, because retaining means may include more than tabs.

3. The Third Rejection under 35 USC 103(a)

Reference is section 6 of the Office Action. Claims 12-14 and 16-17 have been rejected under 35 USC 103(a) as allegedly obvious over *Matsutani* in view of *Rumsey* and in further view of USPN 6,189,861 to *Gotch et al.* (“*Gotch*”).

Matsutani and *Rumsey* have been discussed above as inapposite. Applicant submits that the deficiencies in these two references with regard to claims 12-13 are not cured by the combination of *Matsutani* and *Rumsey* with *Gotch*.

Gotch teaches a diaphragm valve, in which the diaphragm is clamped between two portions of the valve body. *Gotch*, Abstract. *Gotch* differs from Applicant’s invention in several

aspects, and still does not disclose a valve seat or a diaphragm shaped like an ellipsoid, as required by claims 12-14 and 16-17.

Therefore, claims 12-14 and 16-17 are patentable over the combination of *Matsutani*, *Rumsey* and *Gotch*.

4. The Fourth Rejection under 35 USC 103(a)

Reference is section 7 of the Office Action. Claim 41 has been rejected under 35 USC 103(a) as allegedly obvious over *Matsutani* in view of *Rumsey* and in further view of USPN 6,102,0711 to Walton et al. (“*Walton*”).

Matsutani and *Rumsey* have been discussed above as inapposite. *Walton* discloses a fluid control valve, a cage, and a flexible elastomeric diaphragm with a formed convolution to fully open the cage opening. An elastomeric diaphragm regulator with a valve actuator coupled to the guided valve stem is attached to the regulator diaphragm. *Walton*, Abstract.

The Examiner has characterized *Matsutani* and *Rumsey* as disclosing the claimed valve except for the measuring device. Applicant notes that this is not correct, as explained in detail in the preceding sections. In light of such differences, a lengthy discussion of *Walton* appears redundant in the instant case. Applicant notes for the record that *Walton* differs from Applicant’s invention in several aspects, for example, Applicant’s meter device is positioned in the inlet sleeve contrary to *Walton*.

Therefore, claim 41 is patentable over the combination of *Matsutani*, *Rumsey* and *Walton*. Claim 41 has been amended to correct a typing error and, in general, to point out the invention with greater clarity.

5. The Fifth Rejection under 35 USC 103(a)

Reference is section 8 of the Office Action. The Examiner has rejected claims 1-12, 15, 18-21, 23-27 and 31-41 as allegedly obvious over USPN 6,095,484 to Frenkel (“*Frenkel*”) in view of *Rumsey*. Because claims 1, 34, and 41 are the only independent claims among the rejected claims, the present remarks will initially be directed to these three independent claims.

Frenkel discloses a spring diaphragm for shut-off valves and regulators that consists of two storeys connected to one another. The first storey is formed like a portion of a sphere.

Frenkel, Title; col. 2, lines 50-52; Figs. 1-4. The most significant feature of *Frenkel*'s teachings is that the springy ribs positioned in each of the storeys have different functions. *Frenkel*, col. 3, lines 66-67; col. 4, lines 1-2; Fig. 1.

The Examiner has stated that *Frenkel* discloses Applicant's invention "substantially as claimed but does not disclose an elliptical valve seat with the inlet and outlet sleeves having semi-elliptical shapes at the fluid flow chamber." The Examiner has further argued that *Rumsey* provides the missing elements in *Frenkel* to produce Applicant's invention. Applicant notes that this is not correct.

As explained in detail in the preceding sections, neither *Frenkel* nor *Rumsey* teach a "valve seat having an arched profile of substantially elliptical curvature and a flattened central surface," as claimed in claims 1 and 41, that is, that the valve seat includes a weir having a curved profile that is not spiked but substantially flattened. For a graphic illustration of Applicant's claimed invention in different embodiments, see *Applicant*, Figs. 4 and 14. Additionally, neither *Frenkel* nor *Rumsey* teach a diaphragm in which "the dome (305) is substantially shaped like a sector of an ellipsoid."

Frenkel nor *Rumsey* also do not teach a diaphragm with a dome, "the dome being shaped like a portion of an ellipsoid," as claimed in claim 34.

Finally, Applicant respectfully disagrees with the Examiner's comment, at section 9, that "Rumsey clearly teaches the use of an elliptical flow chamber, valve seat and diaphragm construction regardless of whether or not the specific valve structure is disclosed." (Emphasis added). It is well settled in patent law that a combination of references must not only produce a working device having the same elements as the claim in question, but that there must be some teaching, suggestion, or motivation to combine the references. As shown in the preceding sections, the cited references not only expressly teach away from one another, providing no teaching, suggestion or motivation to combine those references, but also fail to produce an operating device due to the opposing constructive features.

In summary, neither *Frenkel* nor *Rumsey* provide a suggestion or motivation to combine their teachings, and a combination of their teachings provides no reasonable expectation of success while failing to provide all the limitations of Applicant's claims.

For at least these reasons, claims 1, 34, and 41 are patentable over the combination of *Frenkel* and *Rumsey*. The claims depending therefrom are patentable at least for the same reasons.

6. The Sixth Rejection under 35 USC 103(a)

Reference is section 9 of the Office Action. Claims 13, 14, 16, and 17 have been rejected as obvious over *Frenkel* in view of *Rumsey* and further in view of *Gotch*.

Frenkel and *Rumsey* have been discussed above as inapposite. The deficiencies in *Frenkel* and *Rumsey* with regard to claims 13, 14, 16, and 17 are not cured by the combination of these two references with *Gotch*.

Gotch teaches a diaphragm valve, in which the diaphragm is clamped between two portions of the valve body. *Gotch*, Abstract. While *Gotch* differs from Applicant's invention in other aspects, *Gotch* still does not disclose a "valve seat having an arched profile of substantially elliptical curvature and a flattened central surface," nor a diaphragm in which "the dome (305) is substantially shaped like a sector of an ellipsoid."

Therefore, claims 13, 14, 16, and 17 are patentable over the combination of *Frenkel*, *Rumsey* and *Gotch*.

III. In the Information Disclosure Statement

Applicant has become aware of prior art, which is readily disclosed in the enclosed Information Disclosure Statement.

IV. Conclusion

Applicant thanks the Examiner for the thorough examination of his patent application, and believes that all the issues raised by the Examiner have been fully addressed. In view of the amendments and remarks submitted herein, Applicant respectfully requests that a timely Notice of Allowance be issued in this case.

If it is felt that direct communication would serve to advance prosecution of the present application, the Examiner is invited to contact the undersigned attorney of record, Franco A. Serafini, by telephone, fax, or e-mail.

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Respectfully submitted,

/Franco A. Serafini/
Franco A. Serafini, Registration No. 52,207
Attorney for Applicant
Telephone: (858) 456-2898
Fax: (858) 225-3920
E-Mail: franco@patentconcepts.com

THEMIS IP COUNSEL
7660 Fay Ave. Ste H378
La Jolla, CA 92037